

Pipelayers, Plumbers, Pipefitters, and Steamfitters

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Significant Points

- Job opportunities should be excellent because not enough people are seeking training.
- Most workers learn the trade through 4 or 5 years of formal apprenticeship training.
- Pipelayers, plumbers, pipefitters, and steamfitters make up one of the largest and highest paid construction occupations.

Nature of the Work

Most people are familiar with plumbers, who come to their home to unclog a drain or install an appliance. In addition to these activities, however, pipelayers, plumbers, pipefitters, and steamfitters install, maintain, and repair many different types of pipe systems. For example, some systems move water to a municipal water treatment plant and then to residential, commercial, and public buildings. Other systems dispose of waste, provide gas to stoves and furnaces, or supply air-conditioning. Pipe systems in powerplants carry the steam that powers huge turbines. Pipes also are used in manufacturing plants to move material through the production process. Specialized piping systems are very important in both pharmaceutical and computer-chip manufacturing.

Although pipelaying, plumbing, pipefitting, and steamfitting sometimes are considered a single trade, workers generally specialize in one of the four areas. *Pipelayers* lay clay, concrete, plastic, or cast-iron pipe for drains, sewers, water mains, and oil or gas lines. Before laying the pipe, pipelayers prepare and grade the trenches either manually or with machines. *Plumbers* install and repair the water, waste disposal, drainage, and gas systems in homes and commercial and industrial buildings. Plumbers also install plumbing fixtures—bathtubs, showers, sinks, and toilets—and appliances such as dishwashers and water heaters. *Pipefitters* install and repair both high- and low-pressure pipe systems used in manufacturing, in the generation of electricity, and in heating and cooling buildings. They also install automatic controls that are increasingly being used to regulate these systems. Some pipefitters specialize in only one type of system. *Steamfitters*, for example, install pipe systems that move liquids or gases under high pressure. *Sprinklerfitters* install automatic fire sprinkler systems in buildings.

Pipelayers, plumbers, pipefitters, and steamfitters use many different materials and construction techniques, depending on the type of project. Residential water systems, for example, incorporate copper, steel, and plastic pipe that can be handled and installed by one or two workers. Municipal sewerage systems, on the other hand, are made of large cast-iron pipes; installation normally requires crews of pipefitters. Despite these differences, all pipelayers, plumbers, pipefitters, and steamfitters must be able to follow building plans or blueprints and instructions from supervisors, lay out the job, and work efficiently with the materials and tools of the trade. Computers often are used to create blueprints and plan layouts.

When construction plumbers install piping in a house, for example, they work from blueprints or drawings that show the planned location of pipes, plumbing fixtures, and appliances. Recently, plumbers have become more involved in the design process. Their knowledge of codes and the operation of plumbing systems can cut

costs. They first lay out the job to fit the piping into the structure of the house with the least waste of material. Then they measure and mark areas in which pipes will be installed and connected. Construction plumbers also check for obstructions such as electrical wiring and, if necessary, plan the pipe installation around the problem.

Sometimes, plumbers have to cut holes in walls, ceilings, and floors of a house. For some systems, they may hang steel supports from ceiling joists to hold the pipe in place. To assemble a system, plumbers—using saws, pipe cutters, and pipe-bending machines—cut and bend lengths of pipe. They connect lengths of pipe with fittings, using methods that depend on the type of pipe used. For plastic pipe, plumbers connect the sections and fittings with adhesives. For copper pipe, they slide a fitting over the end of the pipe and solder it in place with a torch.

After the piping is in place in the house, plumbers install the fixtures and appliances and connect the system to the outside water or sewer lines. Finally, using pressure gauges, they check the system to ensure that the plumbing works properly.

Working Conditions

Because pipelayers, plumbers, pipefitters, and steamfitters frequently must lift heavy pipes, stand for long periods, and sometimes work in uncomfortable or cramped positions, they need physical strength as well as stamina. They also may have to work outdoors in



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inclement weather. In addition, they are subject to possible falls from ladders, cuts from sharp tools, and burns from hot pipes or soldering equipment.

Pipelayers, plumbers, pipefitters, and steamfitters engaged in construction generally work a standard 40-hour week; those involved in maintaining pipe systems, including those who provide maintenance services under contract, may have to work evening or week-end shifts, as well as be on call. These maintenance workers may spend quite a bit of time traveling to and from worksites.

Employment

Pipelayers, plumbers, pipefitters, and steamfitters constitute one of the largest construction occupations, holding about 550,000 jobs in 2002. About 7 in 10 worked for plumbing, heating, and air-conditioning contractors engaged in new construction, repair, modernization, or maintenance work. Others did maintenance work for a variety of industrial, commercial, and government employers. For example, pipefitters were employed as maintenance personnel in the petroleum and chemical industries, in which manufacturing operations require the moving of liquids and gases through pipes. About 1 of every 10 pipelayers, plumbers, pipefitters, and steamfitters was self-employed. One in three pipelayers, plumbers, pipefitters, and steamfitters belong to a union.

Jobs for pipelayers, plumbers, pipefitters, and steamfitters are distributed across the country in about the same proportion as the general population.

Training, Other Qualifications, and Advancement

Virtually all pipelayers, plumbers, pipefitters, and steamfitters undergo some type of apprenticeship training. Many apprenticeship programs are administered by local union-management committees made up of members of the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada, and local employers who are members of either the Mechanical Contractors Association of America, the National Association of Plumbing-Heating-Cooling Contractors, or the National Fire Sprinkler Association.

Nonunion training and apprenticeship programs are administered by local chapters of the Associated Builders and Contractors, the National Association of Plumbing-Heating-Cooling Contractors, the American Fire Sprinkler Association, or the Home Builders Institute of the National Association of Home Builders.

Apprenticeships—both union and nonunion—consist of 4 or 5 years of on-the-job training, in addition to at least 144 hours per year of related classroom instruction. Classroom subjects include drafting and blueprint reading, mathematics, applied physics and chemistry, safety, and local plumbing codes and regulations. On the job, apprentices first learn basic skills, such as identifying grades and types of pipe, using the tools of the trade, and safely unloading materials. As apprentices gain experience, they learn how to work with various types of pipe and how to install different piping systems and plumbing fixtures. Apprenticeship gives trainees a thorough knowledge of all aspects of the trade. Although most pipelayers, plumbers, pipefitters, and steamfitters are trained through apprenticeship, some still learn their skills informally on the job.

Applicants for union or nonunion apprentice jobs must be at least 18 years old and in good physical condition. Apprenticeship committees may require applicants to have a high school diploma or its equivalent. Armed Forces training in pipelaying, plumbing, and pipefitting is considered very good preparation. In fact, persons with this background may be given credit for previous experience when entering a civilian apprenticeship program. Secondary or

postsecondary courses in shop, plumbing, general mathematics, drafting, blueprint reading, computers, and physics also are good preparation.

Although there are no uniform national licensing requirements, most communities require plumbers to be licensed. Licensing requirements vary from area to area, but most localities require workers to pass an examination that tests their knowledge of the trade and of local plumbing codes.

With additional training, some pipelayers, plumbers, pipefitters, and steamfitters become supervisors for mechanical and plumbing contractors. Others, especially plumbers, go into business for themselves, often starting as a self-employed plumber working from home. Some eventually become owners of businesses employing many workers and may spend most of their time as managers rather than as plumbers. Others move into closely related areas such as construction management or building inspection.

Job Outlook

Job opportunities are expected to be excellent, as demand for skilled pipelayers, plumbers, pipefitters, and steamfitters is expected to outpace the supply of workers trained in this craft. Many potential workers may prefer work that is less strenuous and has more comfortable working conditions.

Employment of pipelayers, plumbers, pipefitters, and steamfitters is expected to grow about as fast as the average for all occupations through the year 2012. Demand for plumbers will stem from building renovation, including the increasing installation of sprinkler systems; repair and maintenance of existing residential systems; and maintenance activities for places having extensive systems of pipes, such as powerplants, water and wastewater treatment plants, pipelines, office buildings, and factories. The enforcement of laws pertaining to the certification requirements of workers on jobsites will create additional opportunities and demand for skilled workers. However, the number of new jobs will be limited by the growing use of plastic pipe and fittings, which are much easier to install and repair than other types, and by increasingly efficient sprinkler systems. In addition to new positions resulting from employment growth, many jobs will become available each year because of the need to replace experienced workers who retire or leave the occupation for other reasons.

Traditionally, many organizations with extensive pipe systems have employed their own plumbers or pipefitters to maintain equipment and keep systems running smoothly. But, to reduce labor costs, many of these firms no longer employ a full-time, in-house plumber or pipefitter. Instead, when they need a plumber, they rely on workers provided under service contracts by plumbing and pipefitting contractors.

Construction projects provide only temporary employment. So, when a project ends, pipelayers, plumbers, pipefitters, and steamfitters working on the project may experience bouts of unemployment. Because construction activity varies from area to area, job openings, as well as apprenticeship opportunities, fluctuate with local economic conditions. However, employment of pipelayers, plumbers, pipefitters, and steamfitters generally is less sensitive to changes in economic conditions than is employment of some other construction trades. Even when construction activity declines, maintenance, rehabilitation, and replacement of existing piping systems, as well as the increasing installation of fire sprinkler systems, provide many jobs for pipelayers, plumbers, pipefitters, and steamfitters.

Earnings

Pipelayers, plumbers, pipefitters, and steamfitters are among the highest paid construction occupations. In 2002, median hourly earnings of pipelayers were \$13.70. The middle 50 percent earned between \$10.96 and \$18.43. The lowest 10 percent earned less than \$9.20, and the highest 10 percent earned more than \$24.31. Also in 2002, median hourly earnings of plumbers, pipefitters, and steamfitters were \$19.31. The middle 50 percent earned between \$14.68 and \$25.87. The lowest 10 percent earned less than \$11.23, and the highest 10 percent earned more than \$32.27. Median hourly earnings in the industries employing the largest numbers of plumbers, pipefitters, and steamfitters in 2002 are shown below:

Nonresidential building construction	\$19.65
Building equipment contractors	19.52
Utility system construction	17.81
Ship and boat building	16.62
Local government	16.21

Apprentices usually begin at about 50 percent of the wage rate paid to experienced pipelayers, plumbers, pipefitters, and steamfitters. Wages increase periodically as skills improve. After an initial waiting period, apprentices receive the same benefits as experienced pipelayers, plumbers, pipefitters, and steamfitters.

Many pipelayers, plumbers, pipefitters, and steamfitters are members of the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada.

Related Occupations

Other occupations in which workers install and repair mechanical systems in buildings are boilermakers; electricians; elevator installers and repairers; heating, air-conditioning, and refrigeration mechanics and installers; industrial machinery installation, repair, and maintenance workers, except millwrights; millwrights; sheet metal workers; and stationary engineers and boiler operators. Other related occupations include construction managers and construction and building inspectors.

Sources of Additional Information

For information about apprenticeships or work opportunities in pipelaying, plumbing, pipefitting, and steamfitting, contact local plumbing, heating, and air-conditioning contractors; a local or State chapter of the National Association of Plumbing, Heating, and Cooling Contractors; a local chapter of the Mechanical Contractors Association; a local chapter of the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada; or the nearest office of your State employment service or apprenticeship agency.

For information about apprenticeship opportunities for pipelayers, plumbers, pipefitters, and steamfitters, contact:

► United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry, 901 Massachusetts Ave. NW., Washington, DC 20001. Internet: <http://www.ua.org>

For more information about training programs for pipelayers, plumbers, pipefitters, and steamfitters, contact:

► Associated Builders and Contractors, Workforce Development Department, 4250 North Fairfax Dr., 9th Floor, Arlington, VA 22203.

► National Association of Home Builders, 1201 15th St. NW., Washington, DC 20005. Internet: <http://www.nahb.org>

► Home Builders Institute, 1201 15th St., NW., Washington, DC 20005. Internet: <http://www.hbi.org>

For general information about the work of pipelayers, plumbers, and pipefitters, contact:

► Mechanical Contractors Association of America, 1385 Piccard Dr., Rockville, MD 20850. Internet: <http://www.mcaa.org>

► National Association of Plumbing-Heating-Cooling Contractors, 180 S. Washington St., Falls Church, VA 22040. Internet: <http://www.phccweb.org>

For general information about the work of sprinklerfitters, contact:

► American Fire Sprinkler Association, Inc., 9696 Skillman St. Suite 300, Dallas, TX 75243-8264. Internet: <http://www.firesprinkler.org>

► National Fire Sprinkler Association, P.O. Box 1000, Patterson, NY 12563. Internet: <http://www.nfsa.org>

There are more than 500 occupations registered by the U.S. Department of Labor's National Apprenticeship system. For more information on the Labor Department's registered apprenticeship system and links to State apprenticeship programs, check their website: <http://www.doleta.gov>